

AMENDMENT UNDER 37 C.F.R. § 1.111
U. S. Application No. 09/727,764

REMARKS

Claims 23-94 are all the claims pending in the application.

Claims 23-64, 66-92 and 94 are rejected under 35 U.S.C. § 112, first paragraph.

Claims 23-26, 28, 29, 32, 34, 35, 38, 40, 41, 44-47, 49, 50, 53, 55, 56, 59, 61, 62, 65-69, 71, 72, 75-77, 79, 80, 83-85, 87, 88, and 91-94 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Leow et al. (US 6,192,150; hereafter "Leow") in view of Boone et al. (US 5,101,270; hereafter "Boone").

Claims 30, 31, 36, 37, 42, 43, 51, 52, 57, 58, 63, 64, 73, 74, 81, 82, 89, and 90 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Leow et al. in view of Boone et al., and further in view of Shin et al. (US 6,624,821; hereafter "Shin").

Claims 27, 33, 39, 48, 54, 60, 70, 78, and 86 are objected to, but would be allowable if rewritten to overcome the § 112, first paragraph rejection and to include all of the limitations of the base claim and any intervening claims.

The present invention relates to a texture description method for transforming an image of a time domain into an image of a frequency domain and extracting texture features by Gabor filtering.

Leow relates to a method and an apparatus which matches texture patterns independently of the intensities, scales, and orientations of the patterns.

Boone relates to optical signal processing systems that extract features from optical images for pattern recognition.

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Shin relates to an image texture descriptor retrieving method for retrieving a texture descriptor which is used in searching and browsing an image and describes texture characteristics of the image, and an apparatus thereof.

Applicant respectfully traverses the claim rejections with the following comments.

In response to the rejection under 35 U.S.C. § 112, first paragraph, Applicant amends the claims as shown herein to remove the recitations of “time domain image” and “represented in a time domain.” Applicant submits that the rejection of claims 23-64, 66-92 and 94 under 35 U.S.C. § 112, first paragraph, is hereby overcome.

The Examiner admits that Leow does not disclose the feature of claim 22 of converting a time domain image represented in a time domain into a frequency domain image represented in a frequency domain. Applicant submits that Leow fails to teach or suggest each of the remaining limitations of the claim too.

Specifically, Leow does not disclose filtering the converted image via a Gabor filter having $N \times M$ filter regions to produce a filtered image, wherein N and M are predetermined positive integers, as recited in claim 22. As mentioned above, the Examiner concedes that Leow does not disclose converting a time domain image represented in a time domain into a frequency domain image represented in a frequency domain. Rather, Leow discloses operating on time domain input image signals. It logically follows that Leow does not perform its filtering on a converted image, since Leow’s method operates on time domain input image signals and does not convert input images by a frequency transformation process.

Further, Leow does not disclose determining texture feature values of the filtered image for respective channels, wherein the channels represent a frequency domain division layout

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corresponding to the NxM filter regions of the Gabor filter. Since the filtered images operated on by Leow's method are not converted filtered images, Leow cannot disclose determining texture feature values of the (converted) filtered image.

Likewise, Leow fails to disclose the feature of claim 22 of determining an image texture descriptor of the converted image using the texture feature values. Again, since Leow does not disclose operating on converted signals, Leow cannot disclose this feature of the claim.

Also, Boone fails to make up for the deficiencies of Leow. Boone simply discloses performing mathematical operations such as Radon transforms and Fourier transforms on optical image signals to be output.

Therefore, for the foregoing reasons, Applicant submits that claims 23-26, 28, 29, 32, 34, 35, 38, 40 and 41 are allowable.

With regard to the combination of the references, Applicant submits that there is no suggestion or motivation to combine the references. The Examiner asserts that it would have been obvious to add the 2-D Fourier transform of Boone to the system and method of Leow, but the method of Leow does not operate on converted signals and there is no teaching or suggestion that Leow's method would work properly with such signals. Fourier transforms may have certain desirable properties as described by the Examiner, but there is no teaching in Leow or Boone that using Fourier transforms in the system of Leow as suggested by the Examiner would be desirable in the particular method disclosed by Leow. Moreover, making the modification proposed by the Examiner would render Leow unsatisfactory for its intended purpose of operating on input image signals that have not been converted by a frequency transformation process.

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Moreover, Leow relates to a method and an apparatus which matches texture patterns of images stored in an image retrieval system, while Boone relates to optical signal processing systems that process optical image signals from a liquid crystal television. There is no teaching or suggestion in the references that Boone's processing of optical signals would be applicable to Leow's image texture matching. Rather, the Examiner appears to be using impermissible hindsight reasoning to conclude that it would have been obvious to combine the applied references due to the teachings of Applicant's invention.

Thus, claims 23-26, 28, 29, 32, 34, 35, 38, 40 and 41 are allowable for this additional reason.

Claim 44 and its dependent claims 45-47, 49, 50, 53, 55, 56, 59, 61 and 62 are allowable for reasons analogous to those described above in relation to claim 23.

With regard to claim 65, Applicant amends claim 66, by rewriting it in independent form to include the features of claim 65, and cancels claim 65 by the present Amendment. Applicant submits that claim 66 and its dependent claims 67-69, 71, 72, 75-77, 79, 80, 83-85, 87, 88, and 91-92 are allowable over the prior art for reasons analogous to those for claim 23 described above.

Likewise, claim 93 is amended to include the limitations of claim 94, which is canceled. Claim 93 is allowable for reasons analogous to those described in reference to claim 23.

For the rejection of claims 30, 31, 36, 37, 42, 43, 51, 52, 57, 58, 63, 64, 73, 74, 81, 82, 89, and 90, Applicant submits that Shin fails to make up for the above-described deficiencies of Leow and Boone. Accordingly, these claims are allowable at least because of their dependence from claims 23, 44 and 66, respectively.

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In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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